Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Cancelled)

2. (Currently amended) A sealable crucible for growing a III-nitride semiconductor crystal, said crucible comprising[[:]] an elongated wall structure extending in a longitudinal direction,[[;]] said wall structure comprising a plurality of grains and defining an interior crystal growth cavity,~~; said wall structure including a plurality of grains; and~~ said wall structure having a thickness dimension (i) extending in a direction substantially perpendicular to said longitudinal direction~~, said thickness dimension~~ and (ii) being at least about 1.5 times the average grain size.

3. (Cancelled)

4. (Currently amended) The crucible of claim ~~3~~ 2 being sized and shaped for growing an aluminum nitride single crystal using a sublimation-recondensation technique.

5. (Currently amended) The crucible of claim 2 wherein said plurality of grains
   (i) form at least first and second layers, said first layer including a portion of the plurality of grains forming an inside surface of said ~~crucible~~ wall structure and said second layer being adjacent said first layer; and
   (ii) define a plurality of diffusion pathways within said structure, said grains swelling upon absorption of either nitrogen or the column III atoms of said III-nitride, thereby substantially obstructing at least some of the diffusion pathways.

6. (Currently amended) The crucible of claim ~~2~~ 5 wherein the diffusion pathways defined by boundaries between adjacent grains are substantially obstructed by others of said grains when they swell upon said absorption.

7-8. (Cancelled)

9. (Original) The crucible of claim 2 wherein said cavity includes a substantially cylindrical portion and a tapered conical end portion.

10. (Original) The crucible of claim 2 wherein said wall structure defines a cavity having a transverse dimension ranging from about 5 to about 50 millimeters.

11. (Original) The crucible of claim 2 wherein said wall structure defines a cavity having a transverse dimension greater than about 50 millimeters.

12. (Original) The crucible of claim 2 wherein said thickness dimension is at least about three times that of the average grain diameter.

13. (Currently amended) The crucible of claim 2 comprising a material selected from the group consisting of: tungsten-rhenium (W-Re) alloys; rhenium (Re); tantalum monocarbide (TaC); tantalum nitride (Ta_2N); hafnium nitride (HfN); a mixture of tungsten and tantalum (W-Ta); tungsten (W); and combinations thereof.

14-18. (Cancelled)

19. (Currently amended) A method for fabricating a crucible for use in growing aluminum nitride single crystals, said method comprising[[:]] fabricating ~~an elongated~~ a wall structure from a granular material[[;]], the wall structure defining an interior crystal growth cavity and ~~including~~ comprising a plurality of grains,~~; wherein~~ said grains forming at least first and second layers, the first layer including a portion of the pluraliry of grains forming an inside surface of the ~~crucible~~ wall structure and the second layer being superimposed on ~~superposed with~~ the first layer.

20. (Original) The method of claim 19, wherein the granular material is selected from the group consisting of: tungsten-rhenium (W-Re) alloys; rhenium (Re); tantalum monocarbide (TaC); tantalum nitride (Ta_2N); hafnium nitride (HfN); a mixture of tungsten and tantalum (W-Ta); tungsten (W); and combinations thereof.

21. (Currently amended) The method of claim 19~~, comprising fabricating the wall portion by:~~ wherein at least a portion of the wall structure is fabricated by steps comprising:

(i) pressing the granular material into a desired ~~size and~~ shape;

(ii) sintering the granular material to form a sintered structure ~~crucible~~; and

(iii) heating the sintered ~~crucible~~ structure at a temperature ranging from at at least about 2000 °C to about 2500 °C under conditions suitable to effect grain swelling~~;~~ ~~wherein said heating is effected at at least about 2000 °C.; and wherein said heating is effected at or below about 2500 °C~~.

22. (Currently amended) The method of claim 21, wherein, in step (iii), the sintered structure is heated ~~said heating comprises heating~~ in an atmosphere selected from the group consisting of inert atmospheres and chemically active atmospheres.

23. (Currently amended) The method of claim 19 ~~, comprising fabricating the wall portion by:~~ wherein at least a portion of the wall structure is fabricated by steps comprising:

(i) mixing TaC powder and Ta_2C powder to form a mixture;

(ii) pressing the mixture into a desired ~~size and~~ shape;

(iii) sintering the mixture to form a sintered ~~crucible~~ structure; and

(iv) heating the sintered ~~crucible~~ structure in an atmosphere comprising one or more hydrocarbon gases at a temperature ranging from at at least about 2000 °C to about 2500 °C~~; wherein the heating is effected at at least about 2000.degree. C.; wherein the heating is effected at or below about 2500.degree. C.; and wherein~~ to convert at least a portion of Ta_2C in the sintered structure ~~is converted~~ to TaC.

24. (Currently amended) The method of claim 23, wherein ~~said mixing comprises mixing TaC with: at least about 10 volume percent Ta.sub.2C; and up to about 50 volume percent~~ the mixture comprises between about 10 and about 50 percent of Ta_2C by volume.

25. (Currently amended) The method of claim 23, wherein ~~said mixing~~ step (i) further comprises adding Ta to the mixture.

26. (Currently amended) The method of claim 19~~, comprising fabricating the wall portion by:~~ wherein at least a portion of the wall structure is fabricated by steps comprising:

(i) mixing Ta_2N powder and Ta powder to form a mixture;

(ii) pressing the mixture into a desired ~~size and~~ shape;

(iii) sintering the mixture to form a sintered ~~crucible~~ structure; and

~~(iv)~~ heating the sintered ~~crucible in about 0.1 to 10 bars of~~ structure in an atmosphere comprising N_2 gas at a temperature ranging from at at least about 2000 °C to about 2500 °C and a pressure ranging from about 0.1 to about 10 bars to convert at least a portion of Ta in the sintered structure to Ta_2N~~; wherein the heating is effected at at least about 2000.degree. C.; wherein the heating is effected at or below about 2500.degree. C.; and wherein Ta is converted to Ta_2N~~.

27. (Currently amended) The method of claim 19~~, comprising fabricating the wall portion by:~~ wherein at least a portion of the wall structure is fabricated by steps comprising:

(i) mixing HfN powder and hafnium (Hf) powder to form a mixture;

(ii) pressing the mixture into a desired ~~size and~~ shape;

(iii) sintering the mixture to form a sintered ~~crucible~~ structure; and

(iv) heating the sintered ~~crucible in about 0.1 to 10 bars of~~ structure in an atmosphere comprising N_2 gas at a temperature ranging from at at least about 2000 °C to about 2500 °C and a pressure ranging from about 0.1 to about 10 bars to convert at least a portion of Hf in the sintered structure to HfN; ~~wherein the heating is effected at at least about 2000.degree. C.; wherein the heating is effected at or below about 2500.degree. C.; and wherein Hf is converted to HfN~~.

28. (Currently amended) The method of claim 19~~, comprising fabricating the wall portion by:~~ wherein at least a portion of the wall structure is fabricated by steps comprising:

(i) mixing W powder and Ta powder to form a mixture;

(ii) pressing the mixture into a desired ~~size and~~ shape;

(iii) sintering the mixture to form a sintered ~~crucible~~ structure; and

(iv) heating the sintered ~~crucible in about 0.1 to 10 bars of~~ structure in an atmosphere comprising N_2 gas at a temperature ranging from at at least about 2000 °C to about 2500 °C and a pressure ranging from about 0.1 to about 10 bars to convert

at least a portion of Ta in the sintered structure to Ta_2N; ~~wherein the heating is effected at at least about 2000.degree. C.; wherein the heating is effected at or below about 2500.degree. C.; and wherein Ta is converted to Ta.sub.2N~~.

29. (Currently amended) The method of claim 28, wherein ~~said mixing comprises mixing W with: at least about 0.5 atom volume percent Ta; and up to about 10 atom volume percent Ta~~ the mixture comprises between about 0.5 and about 10 atom percent of Ta.

30. (Currently amended) A method for fabricating an aluminum nitride crystal, said method comprising:

    (i). depositing aluminum nitride in a crystal growth cavity of a crucible ~~having~~ comprising an elongated wall structure~~, the wall structure~~ defining ~~an interior~~ the crystal growth cavity and ~~including~~ comprising a plurality of grains, the grains forming at least first and second layers, the first layer including grains forming an inside surface of the ~~crucible~~ wall structure and the second layer being ~~superposed~~ superimposed on ~~with~~ the first layer;

    (ii). sealing the crucible; and

    (iii). heating at least a portion of the crucible to a temperature in excess of about 2000 °C.

31. (Currently amended) The method of claim 30, further comprising enabling grains of at least the second layer to swell~~, the swelling~~ to substantially ~~blocking~~ obstruct diffusion of aluminum along diffusion pathways defined by boundaries between grains of at least the first layer.

32. (New) A crucible for use in the single-crystal growth of aluminum nitride, said crucible comprising a wall structure defining an interior crystal growth cavity and comprising a plurality of grains defining a plurality of diffusion pathways within said structure, said grains swelling upon absorption of at least one of aluminum and nitrogen, thereby substantially obstructing at least some of the diffusion pathways.

33. (New) The crucible of claim 32 wherein said diffusion pathways are defined by boundaries between adjacent grains, said grains forming at least first and second layers,

said first layer including grains forming an inside surface of said crucible and said second layer being superimposed on said first layer.

34. (New) The crucible of claim 33 wherein the diffusion pathways of said first layer are substantially obstructed by swollen grains of said second layer upon absorption of at least one of aluminum and nitrogen by said grains.

35. (New) An aluminum nitride single-crystal boule grown in a polycrystalline crucible that comprises an elongated wall structure (i) defining a crystal growth cavity and (ii) comprising a plurality of grains, said aluminum nitride single-crystal boule having a diameter greater than about 20 mm.

36. (New) The aluminum nitride single-crystal boule of claim 35 wherein the wall structure comprises a material selected from the group consisting of: tungsten-rhenium (W-Re) alloys; rhenium (Re); tantalum monocarbide (TaC); tantalum nitride (Ta_2N); hafnium nitride (HfN); a mixture of tungsten and tantalum (W-Ta); tungsten (W); and combinations thereof.

37. (New) The aluminum nitride single-crystal boule of claim 35 wherein diffusion of aluminum through the wall structure during the crystal growth is substantially obstructed by grain swelling due to absorption of at least one of aluminum and nitrogen.

38. (New) The aluminum nitride single-crystal boule of claim 35 having a diameter greater than about 50 mm.

39. (New) The aluminum nitride single-crystal boule of claim 35 having a length greater than about 12 mm.

40. (New) The aluminum nitride single-crystal boule of claim 35 grown at a rate of about 0.3 mm per hour.

41. (New) The aluminum nitride single-crystal boule of claim 35 grown for a period of time greater than about 100 hours.